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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO.   |
|--|-------------|----------------------|---------------------|--------------------|
| 10/604,651   | 08/07/2003  | Chia-Tien Peng       | 10958-US-PA         | 1650               |
| 31561  | 7590        | 03/23/2006           | EXAMINER            |                    |
| JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE<br>7 FLOOR-1, NO. 100<br>ROOSEVELT ROAD, SECTION 2<br>TAIPEI, 100<br>TAIWAN |             |                      |                     | GHYKA, ALEXANDER G |
| ART UNIT   |             | PAPER NUMBER         |                     |                    |
|  |             | 2812                 |                     |                    |
| DATE MAILED: 03/23/2006  |             |                      |                     |                    |

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 10/604,651             | PENG ET AL.         |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | Alexander G. Ghyka     | 2812                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is **FINAL**.                                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-28, 40 and 41 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-28, 40 and 41 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

ALEXANDER GHYKA  
 PRIMARY EXAMINER

Ar 2812  
 Alex Ghyka

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 07 August 2003 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | Paper No(s)/Mail Date. _____.   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____.                                   |

## **DETAILED ACTION**

The RCE of 1/26/2006 has been entered. The Applicants' arguments are not persuasive for the reasons as discussed below. New claims 40-41 are rejected for the reasons of record, as discussed below. The following new rejection is made for Claims 40-41.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 40-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no basis in the Application as filed for excluding catalysts as required by new Claims 40-41.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1, 12, 20-28 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Takayama et al (US 6,610,142) for the reasons as discussed in the previous Office action.**

The present claims generally require forming an amorphous silicon layer over a substrate, performing a plasma treatment, transforming the amorphous silicon layer into a polysilicon layer by laser annealing, patterning the polysilicon layer to form a plurality of island polysilicon layers, forming a channel region and a doped source/drain region on each side of the channel region and forming a gate over each channel region.

Takayama et al disclose forming a silicon oxide film, a plasma treatment, the formation of an amorphous silicon film, and its subsequent crystallization by laser annealing. See Example 1, column 6, lines 40-65. Takayama et al disclose nitrogen and oxygen containing plasmas (column 5, lines 25-35). Moreover, Takayama et al discloses the formation of a channel region, source/drain region and gate in the formation of a TFT transistor as required by the present claims. See Example 4, lines 1-60. Even though, Takayama disclose an additional silicon oxide film, the aforementioned claim limitations are anticipated as the present Claim language does not exclude the additional silicon oxide layer. Takayama discloses that "nucleation sites are controlled by selectively exposing the amorphous silicon film to a plasma". See the Abstract, second to last sentence. Therefore, Claims 1, 12 and 20-29 are anticipated.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2-11, 13-19 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takayama et al (US 6,610,142) in view of Jen et al (JJAP Part 2: Letters 1991, 33 (7B), L997-L979) and Luan et al (Jour. Of Appl. Phys. 1990, 68(7), 3445-3450) for the reasons as discussed in the previous Office action.**

Takayama et al is relied upon as discussed above.

However, Takayama et al do not disclose an ammonia plasma which results in a positive shift of the threshold voltage of the TFT or a nitrous oxide plasma which results in a negative shift threshold voltage.

Jen discloses the formation of a thin film transistor, wherein a nitrous oxide plasma results in a smaller or negative shift of the threshold voltage of 0.5V. See the Abstract.

Luan et al disclose the formation of thin film transistors and the effect of NH<sub>3</sub> plasma in increasing or positive shift in threshold voltage. See the Abstract and p. 3447, section B.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, that the nitrogen and/or oxygen containing plasma of Takayama et al can be

used to adjust the threshold voltage in negative or positive shifts in light of the disclosure of Jen that ammonia plasma results in a positive shift of threshold voltage and the disclosure of Luan et al that nitrous oxide results in a negative shift. A *prima facie* case of obviousness is established, as all of the references pertain to thin film transistors and the use of plasma for the benefit of adjusting the threshold voltage as disclosed in the prior art would be readily apparent to one of ordinary skill in the art.

### ***Response to Applicants' Arguments***

Applicants' argue, with respect to both rejections, that Takayama fails to disclose that a plasma treatment is performed to the amorphous silicon layer. Applicants' argue that in Takayama the plasma treatment is performed to a silicon oxide layer but not to the amorphous silicon layer. The Examiner maintains that Takayama discloses two plasma treatments, one of which is to the amorphous silicon film. Takayama discloses that " nucleation sites are controlled by selectively exposing the amorphous silicon film to a plasma". See the Abstract, second to last sentence. Applicants argue that the amorphous layer in all the Examples is not treated by a plasma. The Examiner maintains that a reference is not limited to its examples. The Examiner notes that on column 5, lines 20-30, Takayama et al discloses "Furthermore, the crystallization occurs more easily by heating the substrate to a temperature range of from 100 to 500 degrees Celcius during the plasma treatment, and more specifically the substrate is heated to a temperature of 200 degrees or higher. This is because the catalytic substances can be more readily obtained at higher temperatures." The Examiner maintains that Takayama

et al reference is referring to the crystallization of the amorphous layer by plasma and catalysts to form polysilicon. The Takayama reference further states that "best results on plasma treatment can be obtained by generating the plasma in an atmosphere.." containing oxygen or hydrogen among the listed gases. Clearly Takayama anticipates the phrase "performing a plasma treatment to the amorphous silicon layer, where the plasma comprises applying an oxygen-containing plasma or applying a hydrogen containing plasma". The Examiner notes that in light of the foregoing passages of Takayama et al nucleation sites pertains to crystallization of the amorphous layer which is achieved through plasma treatment or catalysts. As the presence of catalysts is not required, new Claims 40-41 are rejected. See the second to last sentence of the Abstract. Therefore, the Claims are rejected for the reasons of record.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday through Thursday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873 . The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGG  
March 19, 2006

ALEXANDER GHYKA  
PRIMARY EXAMINER

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